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brought into expression. The Mendelian hypothesis of alternative transmission involves the idea of exclusion, of the formation of germ-cells which are "pure," in the sense that the protoplasmic rudiments of some of the parental characters are supposed to be omitted from some of the germ-cells. For the existence of such incomplete germ-cells only arithmetical reasons have been advanced.

If Mendel could have read the works of Darwin the hypothesis of *alternative transmission* might have been spared. His facts could have been associated with the many other instances of *alternative expression* enumerated by Darwin. Mendelism, as a theory of alternative *transmission* of characters, is still as lacking in a biological basis as in the days of Darwin. The conception of alternative *expression* of characters accommodates the facts better than the Mendelian conception of alternative transmission.

To represent the theories of mutation and Mendelism as emendations of Darwinism necessitated by the discovery of new facts is misleading. In reality these doctrines are fundamentally opposed to the Darwinian conception of evolution by gradual change in the characters of species. Darwinians have often gone too far in claiming that natural selection is the cause of evolution, but the theory of mutation departs as far from the truth in the opposite direction, in ascribing evolution to sudden jumps from one species to another, without any relation to selection.

There is no reason to suppose that sudden individual variations in uniform varieties represent new characters, except as symptoms of degeneration. Uniform varieties are special products of artificial selection or of isolation in nature. A series of mutants arising from the same uniform stock shows a range of individual diversity corresponding to that of the members of a natural, broad-bred species, though the mutants differ from the members of a normal species in frequent evidences of degeneration. Thus the mutations of a narrow-bred variety can be understood as representing the return to expression of char-

acters transmitted from ancestors of much greater and more normal diversity.

O. F. COOK

WASHINGTON,
April 24, 1908

BIOTYPES OF CORN

TO THE EDITOR OF SCIENCE: In my recent article, SCIENCE, June 5, I stated that Dr. Shull, in his investigations of the elementary species of corn, had been led to think that no biotype of corn had twelve rows, but that he had found those which tended to produce ten and fourteen rows. I further stated that Dr. East had been led, from his investigations, to believe that a type existed having twelve rows. This statement was made after having heard a fragmentary discussion between these gentlemen at the recent meeting of the American Breeders' Association.

Recent correspondence with both of these gentlemen shows that the point of discussion between them was as follows: Dr. East, in discussing Dr. Shull's paper, stated that he thinks there is a physiological reason for the ideal number of rows in corn biotypes to be in multiples of 4; and that therefore more biotypes will be found having 8, 12, 16, etc., rows than those having 10, 14, 18, etc., rows. Dr. Shull replied that in his work he had found no evidence that the multiples of 4 are more favored than the other multiples of 2.

W. J. SPILLMAN
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QUOTATIONS

THE COLLEGE GRINDSTONE

THE recently published "Life and Letters of Sir Richard Jebb" must fill the occupants of academic chairs in America with envious despair. This picture of the life of a college professor in Great Britain is far different from that of the college professor in America. It is different, of course, from that of the average university teacher in England; for Jebb was a man of exceptional parts; he was able to do large amounts of various kinds of work—teaching, investigating, lecturing and

writing—all of it brilliant. Nevertheless, he represents an ideal of accomplishment and achievement toward which the English university teacher more or less consciously strives. In America, on the other hand, this notion of the scholar and man of letters combined in one person is but dimly conceived by most members of the academic body; and it has apparently never entered the heads of many college trustees. We have had a Longfellow and a Lowell; and among the living we might name a few more who enjoy something beyond parochial fame; but the vast majority can hope to be nothing more than competent teachers and the editors of useful text-books—a respectable but not an inspiring career.

The reasons for this shortcoming—if we may use so harsh a word—are not far to seek. We need only refer to the fact that in but few places in this country is any tradition of culture firmly established. We have not half a dozen university seats where a man like Jebb would have received strong encouragement, to say nothing of stimulation. Moreover, he would be something of an alien within the university itself. The steady mediocrities and the glib talkers who figure so largely in our boards of trustees and who are not infrequently chosen to college presidencies, are naturally biased by an unconscious but none the less genuine distrust of men who are not of their own kind. These authorities, though they nominally desire to encourage scholarly production, really like best the solid teacher who carries a huge amount of class and committee work capably and without flinching, or that other one who dissipates his energies in keeping the college constituency "warm"—talking at all the teachers' meetings and similar gatherings. These are the activities that, in the eyes of college administrators, actually count, and therefore win solid rewards. Nor is this surprising. Most American colleges are much straitened for money. The one thing which they must do is to maintain the class-room instruction as well as may be, and keep growing in numbers so as to appeal to the public as an institution deserving of more liberal support. To these two ends other aims are, by the pressure of a growing population,

clamorous alumni, and an empty treasury, ruthlessly sacrificed.

To the merchants, manufacturers and bankers, who constitute the backbone of our intelligent and public-spirited boards of trustees, it appears absurd that a professor should find fifteen or twenty hours of class-work a week a heavy load. Three or four hours of teaching or lecturing a day, for nine months in the year, seems to your business man mere play. Yet the truth is that six or eight hours a week of first-rate class work, informed as to the latest results of research, thoroughly digested, and carefully presented, will keep a professor busy. If he attempts more, he degenerates into a machine; he offers the same lectures and cracks the same jokes year after year; he becomes a mere dealer in routine. That is, he has no chance to refresh himself, to get new points of view, in fine, to think. For the professor the time spent in experimentation that is not immediately productive of striking results, in reading, in mulling over his ideas while he walks, plays golf, or rides the bicycle, and in discussing with a colleague the newest theory as to the constitution of matter or the recently discovered fragment of Menander, is not pure loafing or genteel recreation. This is the very process by which he subjugates his facts, assimilates his learning, and ripens his scholarship. But the unhappy truth is that thinking is a luxury in which our average underpaid and over-driven college teacher can not afford to indulge. Whatever his personal inclinations, he knows that the people to whom he must look for approval, for means to extend his department, for library books and laboratory apparatus, for bread and butter for himself and his children—that these people are primarily interested in other things; and that he is at liberty to do only so much thinking as is compatible with devoting all his time and energy to classes and committees.—*New York Evening Post*.

SCIENTIFIC BOOKS

Text Books of Physical Chemistry. Stoichiometry. By SYDNEY YOUNG, D.Sc., F.R.S., Professor of Chemistry in the University of